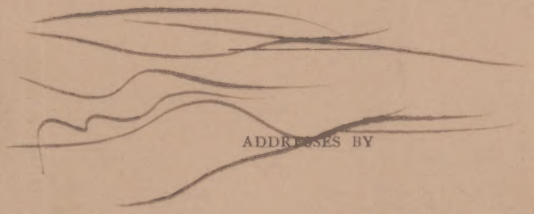
Hunt (E.M.)

HYGEINE:

Its Scope, its Progress and its Leading Aims.

HEALTH AND SOCIAL SCIENCE.



ADDRESSES BY

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AS

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WITH

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I.

HYGEINE: ITS SCOPE, ITS PROGRESS, AND ITS LEADING AIMS.

INTRODUCTORY ADDRESS AT THE ANNUAL MEETING IN DETROIT, NOVEMBER 13, 1883.

By EZRA M. HUNT, A.M., M.D.,

Of New Jersey,

PRESIDENT OF THE ASSOCIATION.

About eleven years ago, on a September day, a few gentlemen met in the parlor of the Ocean hotel, at Long Branch, and completed the organization of the American Public Health Association. With its parentage in the Empire state and its nativity in New Jersey, it added the strength of the one to the true-blue earnestness of the other, and made its outlook upon the ocean the symbol of its breadth of purpose and grandeur of result.

It is often said of men, that they builded better than they knew; but these men knew much of what they were attempting to build. They were neither novices nor adventurers. They had caught the first gleaming of an opening light as it dawned over the mountain-tops; and although it were but twilight, they knew that it meant the daylight of a new science and of a progressive art. Some of them had been members of quarantine conventions which had discussed great questions of national and international protection. Others had had large experience in the disabilities of city life, and had witnessed the sad destructiveness of preventable disease. They already had a Stephen full of spirit and power, and an Elisha wrapped in his mantle of prophetic foresight, a Raunch with good sanitary substance, a White and a Snow fit standard-bearers of a science and an art whose purpose is that cleanliness which well befits personal purity. They had been joined by a goodly company of aids, and the Chariot of Israel and the horsemen thereof were equipped as men valiant for truth and determined upon a vigorous advance. If you will read over carefully the twenty-six subjects they assigned to committees, and the names of those they chose to make reports, you will find a breadth of conception worthy of the men and of their cause, as also far in advance of the professional and public sentiment of their day.

No ordinary work marked the earlier meetings of this association. They were planned with deliberate forethought. They were executed and adjusted with careful adaptation to periods and localities. The claims of scientific research, the testimony of expert investigation, and the analysis of the facts of sanitation were not overlooked. Popular addresses from studious and zealous amateurs, and the full publication of

a public press whose audience and influence were directly secured, made it worth while for the great populace to bend a listening ear.

I, for one, cannot tell you how heartily grateful I feel in the presence of those men, who, with hand-work, head-work, heart-work, and purse-work, moved steadily along in the great effort to disenthrall a nation from the shackles of physical insanity.

Since the earlier years we have passed through perils as well as happy experiences. The Richmond meeting met issues and had results which, whatever may betide to individuals or boards, can never have its blessings effaced. The gratitude of Memphis is something more than the response of an Egyptian oracle. The Southern seaboard and the valley of the Mississippi, amid all the theories about jurisdiction, smile at each other, with thanks, over the practical protection of the coast and inland quarantine they were able to secure. Nashville grasped our hands while its citizens enrolled their names by the hundred for our aid; and New Orleans repeated the welcome, while it pointed to the wonder-working results of its voluntary sanitary administration. Savannah borrowed a zeal and activity from our meeting which is now aiding its citizens in reform. Indianapolis enabled us to change from a merely popular convention to an association guarding against promiscuous rule, and yet asserting that no creed, no occupation, no sex, no favoritism, should exclude any one who was certified as having done good, honest, efficient work in this specific field.

We seek a catholicity as broad as charity, but select as character and knowledge ought to be, and, putting a new pillar of strength at our portals, we propose to adorn it with richer trophies of science and to entwine it with the productive achievements of art.

During our brief existence, what a change has been wrought in the status of our work and in the breadth and tillage of the field for our operations. To recount it would of itself occupy the hour. The great awakening of public sentiment is such that it has become our duty to sift the superficial from the substantial, to guard against crude and callow advices, to cry out for a zeal according to knowledge on the part of sanitary reformers, and to see to it that the practice is not damaged by the dabblings of too hasty and incongruous efforts.

But we may well inquire, Why is it that just now, in the nineteenth century of the world, has there been this great awakening and advance? Surely, parts of the world have been full of people before, and cities have crowded their populations into close proximity. Sickness, pestilence, and death, as also attempts to avert them, are no new things. The classic Herodotus has given us a description of the Grecian plague as graphic and as touching as any of the later descriptions of cholera and yellow fever. Hippocrates, Thucydides, Hecker, and Bascom have written details of epidemics as appalling as any that have visited the more modern world. The Roman satirists depicted in scathing metre the physical degradations of the times. Those of the middle ages revelled amid terror, superstition, and despair, and hurried their helpless victims by

families and by streets into promiscuous graves. Yet Greece and Rome were not lands of ignorance, and in the middle ages intelligence and observation were not dead. "The Regimen Sanitates Salerni," or the Code of Salerno, had scores of editions, in various language, between the twelfth and sixteenth centuries.

If you will judge of the inquiring spirit of the day by some of the subjects of the dissertations of Boerhaave, such as "De Distinctione Mentis a Corpore," or that remarkable essay, "De Comperando Certo in Physics," or his latest thesis, "De Honore Medici Servitute," in which he represents the physician as the servant of Nature, whose activity he is to awaken and direct, you will see that it was not the absence of a longing after the true light that made the results of investigation so meagre and ill defined.

In many an ancient city are still to be seen these testimonies that the people were not unimpressed or unaffected by the perils of disease, and that they were intensely inquisitive as to methods of deliverance. The village of Oberammergau in the Bavarian highlands, and the Passion Play (first performed in 1634) which has made its name familiar, is but an illustration of the awe and intensity of desire which seized upon men to be free from the very evils which were the results of their own ignorant devices. "The Passion Play originated in an outbreak of what was called plague, though it was probably typhus fever. The malady was imported by a peasant who came to visit some relations, and it resulted in the death of eighty persons. This caused so great a panic that the superstitious inhabitants determined to institute a passion play, which was to be repeated every ten years if the plague ceased. As this took some time to organize, the plague had time to wear itself out before the performances were completed, and they have consequently been repeated every ten years." [1]

In English history we ever and anon trace—in civil laws, in blue-book records, in curfew orders, in household inspections, and in efforts amid actual visitations—this reaching out of desire for a greater familiarity with the conservative conditions of human life. So prominent were the evils of insanitary conditions, that Sir John Harrington, a great favorite with his godmother, Queen Elizabeth, who was temporarily banished from her court for writing a work upon an objectionable theme, entitled "The Metamorphosis of Ajax," nevertheless had his book pass rapidly through three editions. And if you will turn to the word jakes, in our Worcester's Dictionary, you will find the following note: "Sir John Harrington, in 1596, published his celebrated tract called 'The Metamorphosis of Ajax' (pronounced ajāx), by which he meant the improvement of a *jakes* or *necessary*, by forming it into what we now call a *water-closet*, of which Sir John was clearly the inventor."

But how utterly inadequate was every attempt that could be made, and how imperfect every conception as to the essential laws of human life and the recondite conditions of its existence! When the Greek said

[1] *London Lancet*, N. Y. edition, November, 1880, page 473.

"*Γνῶθι σέαυτον*," he did not even mean a knowledge of the human framework. The grove of Plato's Academy and the Lyceum of Aristotle were employed about philosophies that threw no rays on the problems of physical life. The only redeeming fact was, that somehow experience had taught that games and athletic exercises made a noble race. We must not be too censorious because Lycurgus, in the absence of all other light, thought that feeble children, for the strength of the race, had better be helped to die, and physical prowess be secured by the laws of heredity. It was only when progress in other sciences and arts made it possible to apply these to the interests of life, that men began to see the wide vista opening in this direction. As, under the light of modern knowledge, one after another of the sciences began to be developed, and to spread out from its general classification into a branch by itself, it was soon apparent that these admitted of application to health and life.

The sciences and arts have no higher possibilities than such as aim at the bettering of human conditions. This always means, to teach men how to live, and that always includes the best physical interests of humanity. To know perfectly the law of a human life, to know how so to conserve that law as to secure to it its normal conditions within itself, and to abate or prevent such environment as shall jeopard it,—that is the Ultima Thule of the sciences.

The moment that Biology became a possibility, that moment it was crowned as the rightful king among the sciences, because it had in charge to analyze and classify facts so as to respond to the demands of life. The conservation of Human Life, the most important of all, at once opened its sphere for patient industry and investigation, bidding the devotees of many sciences and arts to bring their choicest results to bear upon the great problem of human existence. It is not by astute plan, but by necessity, that this department caps a climax. The need of it is not only a self-evident proposition, but an inevitable consequence.

If man were only a machine, then mechanics would be enough, and its highest results and applications being studied in reference to man, the web and woof of life would be all woven. If physiology were only the doings of a chemical laboratory, then chemistry would be enough, and life could be solved in the lecture-room by retorts and chemicals. If nerve force and electricity were identical, then in the study of the electrical phenomena we could unfold the telegraphic and magnetic mysteries of existence. If the body were only the residence of the mind in the sense that a jewel is set in a casket, instead of being intertwined with its minutest workings, then could we study each alone, and care not for the mystery of relationship. But here we are with life, the great concrete of all knowledge, now certified by science and knowledge as admitting of wonderful exploration, and that exploration having direct bearing upon the prolongation of life, and its deliverance from multitudes of complications which embarrass it.

What physician, what philanthropist, what moralist, as he looks out upon the physical entanglements of human life, has not longed for some

open vision by which he could see that God in His infinite providence had in operation laws that if applied would secure greater health and happiness to humanity, and which were the exception only because man by ignorance or vice had come within the domain of the destructive forces, which necessarily and conservatively involve the penalties of lawlessness? And has not that vision begun to appear in our day? Is it not this that marks the change from the past to the present, and gives us a new science as the result? Is not every science and every art bringing its gifts, and its graces, too, and in exuberant profusion placing them around and about us, and pointing out the fact that they bear on life? The materials come faster than those for the building of the temple of Solomon. All Sheba is here with her gifts. No wonder that every neophyte starts to build, while the most skilful are appalled for fear of a chaos.

Yet there are master workmen, and skilled aids are multiplying, and this grand material shall be arranged for the welfare of humanity. The fact having been duly ascertained and certified in our day, that the reign of law is everywhere accurate and supreme in the microcosm, man, and in his environment, the world, that the laws of normal correspondence are equally harmonious and sublime, and that we have by various advances in knowledge and art been furnished with the tools for digging out the precious ore of truth, it is no longer hypothetical to work and work on as those assured of ultimate success. When once the key is known to fit which opens the way into the Alhambra, what recks it that you have not yet seen all? To know that you are within, and have efficient guides, is itself "the gayety of an endless success."

When Columbus, from ship-board, cried, "I see a light," he knew that though it were but a pine knot it meant land. Thus, when along a wooded country road, in my own practice, the first wires for electric light were planted as a quiet experiment, and a revolving magnet one night lighted up the by-way, it was an imperfect thing, but it told that streets and avenues, busy with the hum of moving crowds, all over the wide world, would yet shine with a lustre that would pale the moon and make darkness brilliant as the light of day.

We know not what "unexplored remainders of the human constitution are yet to be illumined," and what mysteries of life are as yet unexplained or unrecognized in the world about us, and how little of perfect exploration has been done; but we do know that there is no mistake as to the discovery of methods and the possibilities of progress, and that these are of such a type as necessitate and certify that life will continue to be explored until its choicest secrets are yielded, and the results applied to the prevention of disease.

The laws of life being known, and known as definite, and aids being furnished to estimate the modes and degrees of variation, we are not easily waylaid or baffled in the inquiry. But we must not forget that it is not enough that we come to know what law is as applied to life, and how reliable is its method of working. Life itself, as we find it, has often so much departed from the law, that a study of how to get back is a

department of hygiene by itself. It means more than therapeutics, more than the usual restoration from sickness to health. When he has found the right way, a sanitarian cannot catch up a human body and whirl it back into its sphere; he cannot by an edict abate all the surroundings. If he could, the very abruptness might be a discord and a disease.

The way of retracing wrongness until it comes to rightness is a wonderful sanitary attainment. The pliability and adjustment that belong to that immense stretch of territory between the abnormal and the normal are no small consideration: when changes have occcurred, and departures from the normal are clearly defined, we have often to be tentative. The bow that has been long on hand, if bent straight by one strong pull, is broken. Some sanitary work is done just about that way.

Dealing with a changed life, and finding established habits, confirmed environments, it may be organic changes, we are to apply principles to a study of the conditions of adjustment as well as to the basic law. There is a law of adaptation within the range of health. The best chance of recovery is often a treatment that is mostly hygienic. Thus the new science not only has its sphere in the treatment of health, but in the study of that series of laws which relates to abnormal conditions, and indicates what hygienic adjustments have to be made in order to retrace our way back to the sphere in which the original forces of nature can have their full play. Thus many a physician finds he has to be a sanitarian because he wants to be a good physician.

Not a few noble minds are much disturbed to know whether hygiene is a science, a philosophy, or an art. Let such turn to Quintelet, as he asks whether statistics is an art, or a science. "Before replying, I will in my turn ask, Which was botany at its birth,—an art, or a science? * * * How defective were the first inventories of the vegetable kingdom, even under the idea of an art; and how little was it considered that botany would one day become constituted a science! Who dreamed then of the ingenious and profound classification since created,—of vegetable anatomy, which should initiate us in the most intimate details of the structure of plants, and of physiology, which reveals to us the mysterious phenomena of their development and their reproduction! What, for their part, were mineralogy, zoölogy, and even astronomy? * * * A science, before presenting itself in its true character, is compelled to undergo different phases. * * * All sciences of observation at their commencement were arts, for they were confined to grouping, in a more or less successful manner, collections of facts belonging to a particular order of things; and it is by the comparison and the study of these facts that they afterwards become elevated to the rank in which we see them shine in the present day. * * * If it still presents itself as an art to the eyes of the majority, its future is not doubtful to those who can consider the sciences of observation in a philosophical point of view."

We can bide our time. If the study of a plant, of a mineral, of an insect, has grown into a science, there is no danger but that the study of life as it exists in man, and the conditions by which it is adapted to its

environment and kept from harm, will certify itself as a science. We might almost rest its claims on the fact that so many sciences recognize themselves, and are viewed by us as having already contributed valuable material to that body of doctrine which we now claim constitutes sanitary science. Chemistry, geology, botany, zoölogy, and natural philosophy, in all their departments, have made their definite offerings, and have been accepted.

Numerical methods are adopted, and pure science, as well as that which belongs to the area of nature, helps to elaborate and certify results. "Inquiries are being conducted on true scientific principles to the exclusion of mere metaphysical or extra-natural speculations."—*Chamont.* Indeed, it has already so pressed its way forward as a science that we need to guard lest the glow and enthusiasm which the name gives to the more recondite and constructive efforts of etiological hypothesis should prevent that precision in art, and in statement as to its results, which is the best guaranty to perfection and progress, both in science and in art. I do not think, my fellow-workers, that we need trouble ourselves much in finding out whether we have a science, when to its investigation many of the ablest students, explorers, classifiers, and analyzers have given so minute and continued attention. Parkes, Petenkoffer, Pasteur, Simon, Farr, and Huxley will perchance rank as knowing something about what makes a science.

The Society for the Encouragement of Original Research in Sanitary Science in Great Britain, with John Simon, John Tyndall, John Burdon Sanderson, and George Buchanan as its scientific committee, probably knows whether there is any outlook in this direction.

Our chief question as an association, it seems to me, is, Are we using, among other efforts, scientific methods, to catch up and keep up with the science? That is the rub. But if it were not a science, it is a great thing to have a great art. When we stand in wondering admiration before a Raphael or a Titian, we do not need to inquire much about how far the painter has derived his power from science. Our own Dr. John Brown commences one of his essays thus: "'Pray, Mr. Opie, may I ask what you mix your colors with?' said a brisk student to the great painter. 'With brains, sir,' was the gruff reply, and the right one." Then, in defining brains, he says, "An art will, of course, admit into its limits everything which can conduce to the performance of its own proper work; it recognizes no other principle of selection." Let "the scientific enlargement be ever so rapid and immense, it has also other sources of strength." The whole of every science may be made the subject of teaching. Not so with art: much of it is not teachable, but acquired. There is in it a sense and a genius that do not all come of science. The sense implies exactness and soundness, power and promptitude of mind, and the genius or native aptitude and tendency to the calling or pursuit. Thus we get skill,—the power of doing the thing as it ought to be done. The practitioner of hygiene often finds out *what is truth*, and what to do, before the scientist has answered that other question, How can these

things be? Allied as they are, the first is a great question, and often admits of a practical answer, while the inquiry as to the second is quite incomplete.

There is an incoming knowledge from the senses, from observation, from contact with the work, which no science can impart. There is even that which is tactile almost as much as is the skill of the artist. There is a breadth in the knowledge and in the application of experience which no merely scientific accuracy can delineate. Indeed, a great portion of the capacity of the skilled, working sanitarian is derived from a combination of resources and qualities for which the actual doing is a necessity. Science surely is one of the chief senses, but the others are indispensable, while a common sense needs to preside over a practice that has in it as much of art as of science.

Because we use the term practice as applied to such arts as those of hygiene, medicine, law, etc., we need to remind ourselves that the term is not meant to remove them from the sphere of arts, but only as distinction between the fine arts on the one hand, and the trades on the other. We claim that the art of hygiene has had enough triumphs in our day for us, while cherishing it as a science, to rejoice in it as an art, and as such to take in the full scope of its applicability. Although the light that has penetrated the inner temple reveals to us alcoves still unillumined, we see enough to know there is science still to come,—an art still to be greatly advanced. It may take a spectrum analysis to decide on which side of the line to arrange colors that blend closer than those of the rainbow, but in the meantime we cannot err by using scientific methods, or by applying with skilled art all that facts and experience have taught. Be assured that this work we are humbly attempting has more of physiology, psychology, biology, and all the other ologies; of air, heat, electricity, all mechanics, and all forces of nature; of genius, of skill, and all the appliances of art in it,—than has ever yet dawned upon the average conception of the citizen. It is a service which invites the patient industry and the well-poised enthusiasm of the thinker, the investigator, the artisan, and the true student, in almost every department of practical inquiry.

To its place as a science, to its practice as a high art, it adds its claims as a philanthropy. There is no knowledge so intellectual and profound, no pursuit so artistic and admirable, but that as you cleave through it you need to read Charity as plainly as you can good words in the sugar blocks of the confectioner, and see around it and over it Philanthropy such as is an essential part of its contact with society. It is not that kind of philanthropy which is patronized, or which is the veneer of selfishness, but that genuine grain which runs through the very substance of the art.

It takes hold of the affections as well as of the intellect and skill, and appeals to those heart sentiments which we mean when we speak of whole-souled earnestness for the welfare of our fellow-men, and heartiness such as takes our yoke-fellow by the hand, lifts the burden of avoid-

able sickness from off the shoulders of whole communities, and enjoys doing it not only because it is scientific and practical, but because vir means man, and virtue means manliness, and manliness means hearty, whole-souled endeavor to limit human woe and sorrow, and to unfurl the banner of a skilled philanthropy.

Aye, it is even more than this. The aspiration and the inspiration are Divine, as well as human. The work is not a preachment, but a life,—not piety, but religion,—asserting much for primary beliefs and intuitions, and rebinding us to the Creator.

Amid these studies and their outcomes are the most wonderful attestations of infinite plan, of infinite working, of an infinite loving-kindness, too. An infinite plan, because law is ever springing back to its norm with an intensity which is not accidental; infinite working, because life is so imprinted with the divine original that it never as an entirety will acknowledge its departure irremediable, but is intensely reparative in the direction of its original creation; an infinite loving-kindness, because the very law shows the Father according to the wise laws of His life and His love as making all science, all art, all experience, attest that the standard is right, and that reparative tendencies and possibilities are wonderful, and that when His way is known in the earth His saving health will be known among all nations.

Because life has so much that is material, and so much that responds to physical law, it is not irreligious. Half-knowledge is blind, and sometimes precipitate, but the more we see of the rhythm and the harmony of the plan with which creation's dawn began, the more it attests an outreaching desire for order, purity, wholeness, and wholesomeness. It shows us humanity is still a temple, with an outlook toward restoration, if only our method of working is by the Creator's law of nature, and our motives a part of the Christ-love for our race.

I never read the "Life of Faraday," by Prof. Tyndall, without seeing how science and religion belong together,—how even the latter does reverence to the faith of the former, and is better in his spirit than in his doubts. I come to understand how, in one of his addresses, after a soliloquy to "uprising life," he said, "Can it be that there is no being or thing in nature that knows more about these things than I do?" and answers by saying that "A man capable of being penetrated by profound thought, will never answer the question by professing that creed of atheism which has been so lightly attributed to me."

Thus, gentlemen, I think we are not presumptuous when we claim that to-day we have a pursuit for which science, art, philanthropy, and faith have planted each their chief corners, and that we are to rear a structure that shall have living stones polished after the similitude of a palace, and adorned with gifts and graces that are the insignia of all that life, liberty, and true happiness mean.

We cannot be too profoundly impressed with the largeness of our subject when we speak of state medicine. Concentration of attention on a few popular themes is quite too apt to narrow our vision, and to lead us

to overlook the vastness of area which it includes. It is not enough that we talk of food supply, *materia alimentaria* instead of *materia medica*, of water supply, of pure air, of heating and ventilation, and end up almost every subject with an indictment of sewer-gas and a crack at the plumber. It is well, indeed, when attempting to deal with any one of these, that it be investigated thoroughly, and with fixedness and concentration of purpose. But it is also needful that an organization like this should recognize the boundaries of its science, the extent of its art, and so map out the great sphere of its operations.

Our starting-point is the one syllable that means more than all else that the world contains—it is life. What it is, what are the conditions of its existence, of its normal being, of its highest health,—that is one side; and that means law in its exactest conceptions, its most definite declarations, its most accurate conservation, its nexus the Creator, its circumference the creation. On the other side it is death,—what tends to it, what interrupts it, what counteracts all the forces that imperil human existence.

The physician deals with great afterthought, the hygienist with greater forethought, and forethought is generally better than afterthought. The hygienist anticipates: he is preventive, not merely in the sense in which the physician treats already existing disease, but in a sense far more explorative and fundamental. Because it is the study of life, with a view to a knowledge of disturbing forces in order to remove or limit them before they come into operation, it has an outreach that is singularly sublime in its vastness. It takes hold of life and its profundities with a more down-reaching grip than that of the treater of disease. It is because of this that *ab initio* it summons the workers from dozens of departments, and hails them not as aids, addenda, ornaments, or patrons, but as elements which alike concern foundation and superstructure. It is for this reason that, behind pathology and histology, we must get back into all that biology means, including not only comparative zoölogy, but vegetable physiology, and the study of that entire environment which affects life. Hence we already find many workers, who, with the realization of this, are peering into life in its minutest forms, and recording not merely by word of mouth or by stroke of pen, but by micro-photograph the behavior of life in its infinitessimal morphology, and the relation of matter thereto. Beginning thus with such a watchword, where can you stop your watching and inquisitive circumspection?

All natural law must be asked to define itself in the statute book of such a physiographer. All variations must be asked to record the law of their variation; all disturbing forces must reveal the methods of their madness. The processes of devitalization must be known as definitely as vitality, the law of disease as precisely as that of law-abiding ease, the law of death as exhaustively as that of life. Do we not, then, need to tell each other that this means more than any other science on the earth can mean,—that such a science—such a group of sciences—means more in art and in diversity of practical application than any other art of the uni-

verse can mean, since no science can have so many arts and so much of needed practice as that which tells and teaches the world about life, of which health is the patron saint, and happiness the earthly crown of rejoicing?

Hence, how have the subjects multiplied upon us, and not less a sense of the need of deeper insight. Air has to be searched not merely for constituency beyond its chemical forces, and the invisible plants and animals it contains, but for the laws of its circulation and diffusion in house, cellar, wells, along surfaces, and in pipes, with an accuracy of experiment never dreamed of twenty years ago. Not every current travels through the pipe made for it, and many a ventilator is either only a vent, or its *cowl* the hood of an effigy.

Heat, as to its laws amid our furnaces of affliction, and all the machinery of modern apparatus, and in its production in the body and in the house, is a specialty quite different from the study of the sun, or from the definition of it as a mode of motion. Water is more ancient than the flood, but its bearing on life is not yet settled. We have been glad of what the chemists have done for us, but it is R. Angus Smith that has just told us "that examinations by Koch's method are far more important than the chemical," and that "chemists must prepare for a new condition of things." Light, as to its agencies on organic matter, and the effects of its exclusion from cities and all underground structures, is yet a twilight. Cleanliness and filth are old words, but dirt has its secrets deeper than the dirt philosophy has ever fathomed.

We have made some grand vital attainments as to the uses of food and its conversions, but its adaptations to conditions are yet demanding close analyses. How sanitary training, teaching, and practice shall enter into education, is a theme on whose determination the destiny of entire races is awaiting. The vital movements of population, and how to deal with all statistics so as to conserve the vital interests of the nation, are yet undetermined. Political economy and race vitality, which means national existence as demanding health administration, offer a field as broad as that of medical jurisprudence. Both patriotism and sociology have direct claims upon us. The rights of labor, and the common interests of labor and capital, must yet learn from us certain inalienable rights of all operatives,—as to factories, as to noxious trades, as to exposures to dust, to smoke and injurious gases, and the abatement of effluvium nuisances.

It is to be borne in mind that some of the work to be investigated, and some of the sanitary problems to be solved, are distinctly American. While we can never too highly appreciate the debt of gratitude we owe to Great Britain, Germany, France, Switzerland, and Italy, yet there are studies which are distinctly our own. Yellow fever and cholera infantum are specimens of diseases which, although having modes of investigation allied to those of others, have yet a historical and a clinical study which requires specific analysis. As to many of the contagions of the old world, there is reason to believe that we have not as yet fully reckoned

the influence of the great change which the soil, climate, and other conditions of the Western Hemisphere involve. Malaria, as it appears in our own country, as its types seem almost to shade off into typhoid or yellow fever, may be aided, but cannot be settled, by the facts which are reported from the Ganges, Salisbury, and Ely.

The capacity of our rivers to dispose of sewage cannot be determined by a reference to the sluggish Thames, or the Seine, or the Tiber. All these may give some information, but there is a wonderful study of adjustment and modification of truth by localities, climate, etc. Some of our experiences as to heating and ventilation show that we have not made due allowance for our modes of building, our climate, and the various incidents of changed American life. Some food adulterations are quite American, and we cannot learn all from abroad as to canned fruits and vegetables, potted meats, and condensed milk. Emigration and interstate immigration are great disturbing factors as to our vital statistics, and the field of study is quite different from that of lands where standing armies exist. It is a great field, a most important field, in its bearing upon social facts and indications in a civilization distinctly American. Sanitary administration and jurisprudence need to be very different under our national, state, and municipal governments from that which obtains abroad.

In all these, and many other respects, much is to be learned by a knowledge of foreign investigation, methods, and ideas. But we need very distinctly to recognize that many sanitary studies must be national and local, and that the law of adaptability must be paramount. There is in our art so much that is relative and constructional that we are constantly seeing how artisans in every sphere, and students in every department, are coming to feel that their vocations must have an eye to the appreciation of life from the stand-point of preservation.

The time has come when the builder cannot be excused if he knows nothing of the porosity of the material he is using, of the relative sanitary value of different kinds of stone, brick, lime, cement, sand, and mortar. The worker in metals in any form as placed in buildings must, with the details of his art, know how to test the thickness and consistency of his pipes, the methods of jointure, and the laws which govern and affect the various changes that may take place either in the material itself, or in the functions it attempts to perform. The principles of the physical sciences are so far involved that art cannot afford to be ignorant of the significant facts which govern the practical use of all household tubing and appliances connected therewith. The engineer is constantly dealing with questions that involve great principles of hygiene; and because his vocation demands previous study as well as actual work, he is the more ready to recognize that sanitary engineering is a department which must have thorough investigation.

Above all, the physician must feel that not only does he need to know something about sanitation in general, but that much of it is "an integral part of the art of medicine, and cannot be withdrawn from the consider-

ation of its professors without great injury to their function as healers." The medical profession has great occasion to hail sanitary science and art as its great introduction to a new era of development and progress. Nature is never empirical, and the only way for medicine to cease to be empirical is to reconstruct its foundations and its methods on this new basis. It is not new in the ideal. Dear old Hippocrates caught a glimpse of the mystery, and in his own conceptions outlined the hypothetical possibilities. But he was like the Xerxes of a well-nigh helpless army. He knew that nature was the art of the Creator, and that man must somehow come to be a sharer in that art before the practitioner could walk with a strong and steady step into the temple not made with hands. He was not skeptical as to such an outcome, and so he called the men who sought this knowledge physicians. The right name projected itself into the futurity, and that future is on the eve of realization. The darkness has been illumined by the sciences, so that man is studied for the purposes of health, with instruments of precision that let in the light and lenses that reflect it.

These are mysteries, but no longer do we doubt what we mean when we speak of the physiological methods of life, of health, of remedies, and of the physiological actions, by which there is prevention or amelioration of disease. Our etiology is not all a groping in the dark; our peering into life is not like that of Sir Thomas Browne practising uriscopsy without a test-tube, a reagent, or a microscope; our thwarting of disease is not the mumble of fetish incantations over some broth of bitter herbs, or the intestines of pigeons. No longer should the idea be with the physician that he is only a treater of disease. His first knowledge needs to be of health, that he may know the lines of departure therefrom, and the methods of its recall. It is a pleasure to know that in our work we are making ourselves and others better physicians, that we are commanding, on behalf of the profession, the aid of our fellow-workers in allied departments, and that each ray shed on the prevention of disease is reflected on the method of its cure.

It is wonderful to see how to-day the laws of hygiene, both in medicine and surgery, are determining and directing therapeutics. A skepticism is as dominant in medicine as in surgery. We have come to the general acknowledgment of the restorative agency of a well understood and carefully prescribed hygiene. All this means that the sanitary expert, whether mechanic, engineer, chemist, law-maker, or physician, must have breadth as well as specialism. Acquaintance with scientific methods is so essential that it almost necessitates a knowledge of some science or experimental department, if for nothing else than as a technic to impart this.

I have thus only hinted at a wideness like the wideness of the sea. Over it broods the spirit of a true inquiry, fostered by science, and zealous for art and practical service. It will not be in vain. For those intent on such service, nature has mysteries only that in unravelling them mankind may get the full impress of their meaning, and so bring the

species back nearer to the reign of law and the prosperous pleasantness of healthful obedience.

At this point it may behoove us, as an association and as individuals, to take our reckoning, and to inquire what are the chief directions in which our vigor is to be exerted. The working Sanitarian of to-day may propose for himself any one of at least three spheres. He is (*a*) either an original investigator, or (*b*) a collector and sifter of the alleged facts bearing on the preservation of life according to the laws of evidence, or such (*c*) a practitioner in the administration and application of sanitary methods and experience as makes him efficient as a health officer. Seldom do we find all these capacities in one man. But in each of these there is opportunity for the highest attainments, and for great service to hygiene and to mankind.

In the line of original investigation, no field has of late years been so prominent and so productive of working hypotheses, theories, and results as that of epidemiology. It has not only sought for the causes of those recognized epidemics which from time to time through the ages have ravaged continents and oceans, but has been able to trace to a parasitic or specific origin many diseases once regarded as constitutional. Just a brief insight into the extending scope of the inquiry is afforded by a *conversazione* which took place at the house of Dr. George Buchanan, F. R. S., the head of the local government, department of health, within a year (October 18, 1883). Dr. Cobbold exhibited preparations of ova and living ciliated embryos of *Bilharzia hæmatobia*. "The embryos were seen making vigorous movements within the firm outer shell of the ovum, which finally ruptured, and allowed them to escape. The specimens were obtained from a patient who had contracted endemic hæmaturia while in Egypt." Dr. Klein also demonstrated specimens of bacillus tuberculosis in the sputum and lung from tuberculous patients; from the lung of a cow suffering from bovine tuberculosis (Perlsucht) of the bacilli of anthrax and septicæmia, of the bacilli met with in the Welbeck and Nottingham cases of ham poisoning, and the micrococci present in the lymphatics in ovine variola, and the blood and liver of patients suffering from infantile diarrhœa.

"A section through the tongue from a case of actinomyces bovis also showed very beautifully the stellate masses of fungus, surrounded by a deeply-stained layer of inflammatory exudation, containing numerous leucocytes. Specimens of the embryo filaria sanguinis hominis from the blood of a patient suffering from chyluria, and from the Chinese mosquito, were exhibited by Dr. Stephen Mackenzie. Examples of trichina spiralis in the muscles of a wild boar, of drauncultus embryo, of the micrococci of diphtheria, septicæmia, pyæmia, and ulcerative endocarditis, and of the ringworm fungus (trichophyton tonsurans), artificially cultivated, were also shown by Drs. Bastian, Gibbs, Henderson, Mackenzie, and Mr. Malcolm Morris."[1]

Or this description of the laboratory of the Berlin Board of Health, in

[1] *London Lancet*, January, 1882, page 80.

its pavilion at the hygienic exhibition now just closing, it says,—"Here are to be found the different kinds of sterilizing apparatuses, the thermostate after d'Arsonval and Leitz's microphotographic apparatus. There are exhibited, besides, specimens of all micro-organisms, till now bred in pure cultures, from the common penicilium up to the bacilli of anthrax, tuberculosis, and farcy. Here Dr. Robert Koch himself and his assistants are demonstrating in the most liberal manner the principles of their methods, as described in the 'Communications of the Board of Health.'"

Thus no longer need we trust to what might be the distorted vision or prejudiced views of individual observers, but can call upon them to reproduce what they have seen that we may see also, and then make our own synopsis of facts and deductions therefrom. Science and art are sure to advance when the *ipse dixit* vanishes, and numbers of competent witnesses are at hand to verify the observations made. It is thus that this line of inquiry now takes the lead in that department which relates to the causation of disease, and identifies so many diseases with the presence of "microscopic fungi." This presence admits of various hypotheses in explanation. Beale calls the ever-growing fungus "the most universal of all kinds of living things, occurring wherever it finds its pabulum." Some regard its presence in disease as the indication of the diseased processes which have been set up, rather than as the incipient cause to the extent of constituting the malady. Even such admit that the multiplication of the Bactaria may, by the demands of ephemeral life, by their own metastasis, or by a mechanical clogging up of glands or ducts, determine the gravity of the disease. In this line of inquiry there is yet much to be explored. The transfer of the harmless into the virulent bacteria, the taming of the virulent into the benign, the conditions of its transfer so as to protect against disease, the various modes of destroying harmful bacteria in the system,—in a word, all the study of infinitessimal zoölogy or botany, as natural to or implanted in the human being,—is not this still a marvellous territory open for wide investigation, dividing itself up into specialties, in which any skilled observer is almost sure to elicit some new facts? Nor is the study of the causation of disease confined to this department. The origin of diseases, their habitats, their conditions of propagation, the chemical, the mechanical, the atmospheric, the telluric influences which affect them, all come within the domain of this division.

The executive committee of this association has shown that it does not intend to forget its duty in the line of research, and so, in the choice of *malaria*, and in the papers it has invited, has at this meeting made good provision for those who labor in such a field. We, perhaps, here have need of caution, since an overreaching may be a great misfortune to sanitary progress.

In the prominence given to the doctrine of the mycotic specificity of disease, there is much danger that associated influences will be overlooked. This has been variously manifested in connection with epidem-

ics, or the occurrence of periodic fevers. In the last epidemic of yellow fever there was more of a disposition than ever before to look upon the visitation as a winged pestilence, or a stealthy intruder, which, after its arrival, did its deadly work in spite of or quite independent of surroundings. The doctrine of the epidemic constitution of the atmosphere was so far revived as that many ignored the relations of filth to the actual progress of the disease.

In a trial the last year in Massachusetts, the doctrine of vegetative specificity was made to tell against the possibility of local origin, and expert sanitary witnesses for the defendant practically denied that vegetable decomposition, stagnant water, and heat had any appreciable relation to malaria.

It cannot be said of any disease proven to be dependent upon or associated with a specific infective particle, that its presence or virulence is independent of person or surroundings. Even where the seed is not indigenous, and the sower who goes forth to sow is unseen, yet if it fall by the beaten wayside, or where there is no depth of earth, in the unfriendly soil of a pure life or a pure dwelling-place it perishes as surely as an invading army perishes without its commissariat.

These marshes and lowlands, amid moisture, vegetable decay, favoring temperature, and other conditions of climate, cause an "organic vitiation" of the atmosphere. "This organic matter of exhalation is still one step removed from malaria: it is only the ground of malaria, the soil on which a malarial growth will propagate. Its decomposition is held to supply the means of fecundity to the germs of disease. In warm air, with excess of moisture, it may undergo a rapid and somewhat fetid decomposition. With a smaller proportion of moisture, or when it is rapidly absorbed with the moisture by diffusion into air of American dryness, it does not decompose so rapidly, but is likely to be absorbed by any hygroscopic substance with which the air containing it may come in contact." Now, in view of well-established facts as to the influences of paludal localities, I submit that with differences of climate, of local surroundings, and with constant changes of surface and winds, it is not very obscure; that the effect in some seasons is less than in others; that some places become malarial which once were not; that winds lift it along adjacent hill-tops; or that there are all grades of intensity, from the dumb chill to the intense remittent, with symptoms well-nigh typhoid. Certain facts of microscopical morphology, as to mildew, thrush, and the odium of fermenting wine, show protoplasm and the living vegetative organisms so allied that it is not improbable, and does not involve the doctrine of spontaneous generation to say, that under certain concurrent conditions there may be new and destructive hybrids of species suddenly originating on the spot. Is it not erroneous to defend such a locality as not a cause of malaria, because, forsooth, it is claimed that some specific particle must be wafted to the spot? All the more, because if this were so, that particle is as sure to find its way to such a spot, as what we call natural grass is sure to grow unsown on fertilized fields, and because it has not

yet been shown that such plant life does not uniformly exist in such soils ready for exuberant growth when all the conditions essential to its productivity are reached.

Even granting a vegetative specificity to some diseases, note the fact that "variations in nutriment, in temperature, air supply, and stage of growth at which propagation takes place, may convert one of the most harmless of microphytes into one of the most deadly," and this conversion may take place on the spot. Where the carcass is, thither are the eagles gathered together; and eagles though they be, where the food is wanting they perish as in a wilderness. All the more, because we are constantly finding that there are great limitations to the destructiveness of infinitesimal life, and that it is only operative in certain stages of its changing and ascertainable development.

The old and well known facts as to the preparing of a system for inoculation, and the benignancy conferred on small-pox by it, is a standing evidence that soil sterilization within a man, as well as about a man, is a potent doctrine in connection with the prevention of epidemics; for to have an epidemic you must not only have the arrival of a seed, and its sprouting somewhere, or in some few bodies, but such general receptivity or culture, solid or fluid, as makes it to prevail among the people. On such a point the recent testimonies of the cholera commission of the German empire, which met in 1873, and within a year ended its labors, is very notable. It has been in hands of close observers during the ten years that have marked the great epoch of "germs," and yet what say Pettinkoffer, and even Heirsch, both believers in specificity, and the latter believing much in the capacity of germs for making for themselves a home?[1]

Pettinkoffer says that "any one looking at the charts, and observing the sharply defined limits of the localized epidemics, must come to the conclusion that mere intercourse with cholera cases or cholera-stricken localities had nothing to do with the spread, but that the most important part was played by the locality itself to which the disease germ was brought, and that it always depends upon locality for *epidemic* development."

The report of Dr. Pistor, of Oppeln, as to the thirteen decided epidemics there, including 44,904 cases and 21,329 deaths, as stated by Heirsch in the sixth part of the report, lays remarkable stress on the fact that lines of railway are not exceptionally attacked; that it must find conditions favorable for its development, such as crowded and foul localities saturated with decomposing substances, and a condition of soil favoring decomposition.

The entire commission united in this summary "of all the measures which may be applied to the prevention and combating of cholera. Those take the first place which have for their aim the improvement of general sanitary conditions. All specific measures against cholera will prove unavailing, unless we pay the strictest attention in inhabited places

[1] See *Med. News*, March 24, 1883, p. 331, and translation of Dr. Chamont.

to the purifying of the soil from organic and easily putrifying refuse, to the drainage of the soil, to the constant flushing of the sewers, to the frequent emptying of cess-pits, the complete doing away with pervious cess-pits, the careful inspection of dwellings and closing those that are really hurtful, the provision of pure water both for drinking and other domestic purposes, and the like. The commission expresses here the united opinion of all, that the measures demanded by public, general hygiene offer the best protection, not only against cholera, but against all other epidemic diseases."[1]

Prof. Horsley, of the University of London, in his classic and experimental contribution, says,—"Where there is faulty hygiene and impaired vitality, there is consequent easy invasion by vegetable organisms." Although the animal system is everywhere surrounded by these parasites, "during health no vegetable organisms are found in the blood." The particle like moisture may be in the air, but the person and the place determine the manifestation. This dew of disease as a rule will not be found in the gravel highways of purity, but will drench with its death-sweat the fields and the bodies rich in the food on which it thrives.

Were you a king, and did you know that unseen demons were in the air, and that no evil could betide until they alighted, and that all history and experience showed that they alighted and revelled to the destruction of life chiefly where filth and foulness abide, would it not be trifling to spend all the time on "doctrines of invisible devils," instead of joining Hercules, and cleaning up the filthiest part of the kingdom of Augeas? So let not any theory obscure the fact that locality is a factor which can neither be ignored nor depreciated.

It is well that the advance workers in etiology, and the advanced believers in the significance of infective particles with a specificity of their own, are not the ones who unsettle courts and juries, and becloud the muddled public by what amounts to this: the germs of disease come floating from afar; therefore, don't spend your time in taking care of yourself, or of local conditions, for you can do nothing until you get on the scent of the microphytes.

Any one who will read the views, even of Heirsch as given in connection with the report of the cholera commission, will, I think, see that, while giving prominence to the infective particle as the chief factor, he does not set aside locality so far as do some of our modern experts.

It was not to be supposed that Sir Joseph Fayrer, with an experience almost confined to India, and as inclining to new hypotheses as to cholera, typhoid fever, etc., should let the remittent fevers of India go without a similar application of his doctrine. In reply to his address of November, 1879, a reviewer has well said, that his observations, as detailed by himself, "do not admit of comparison, in their precision and accuracy of detail, with the observations on which the contrary conclusions have been formulated. It is not to be forgotten that an overwhelming majority of Indian observers concur with English epidemiologists." The question

[1] *San. Record*, December 15, 1882, p. 247.

has obtained prominence from the accident of certain official relations of the Indian dissentients, not from the scientific value of their doubts.[1]

But be it remembered, that however important and fundamental to preventive medicine is an inquiry into the causation of disease in order to its prevention, nevertheless progress in sanitation is possible, independent of this knowledge. While these searches after infective particles, and the results already achieved, mark a wonderful era in this department, there are four other inquiries as essential, namely, the influence of locality, the laws which govern the susceptibility of individuals, the methods of prophylaxis, and what methods of hygiene are applicable after invasion. Even in diseases believed to have a specific contagion, we will practically succeed first in looking after the conditions of its nutrition. "These," says Pettinkoffer, "we are likely to discover long before the germ itself, just as sugar was recognized in grape-must and beer-wort as the necessary substratum for alcoholic fermentation long before the part played by the ferment and fungus was understood."

We do not yet know the life history of the vaccine vesicle, and yet this has not prevented the application of the first and perhaps greatest boon in the direction of dealing with epidemics.

There are multitudes of questions, both scientific, statistical, and practical, and numberless derivations from analyzed experience, which go to make up the practice of hygiene, which are very independent of a technical knowledge of causation. Even original investigation is far from being confined to the sphere of etiology. The man who by ten thousand measurements in school life determines the law of growth and modifying influences, or the man who tests the resisting power of one thousand tubes, their proper calibre, the flow of air currents through the pipes, the influence of syphonage and all that relates to them as carriers of liquids, and so arrives at a law of direction, is also a skilled and original investigator. These are but examples of hundreds of lines in which close observation is needed, and in which those who are busy are serving the interests of preventive and protective hygiene.

That next class of sanitarians which has capacity for collecting and sifting, men omniverous in a specialty, of wide reading, of editorial insight, who can apply the magnet which will separate the true steel from the conglomerate mass, who can arrange and classify, and with expert judicial mind can weigh the evidence, separate the inconsequent from the essential, and then state the result with clean, clear-cut logical analysis, are no less valuable to the progress of our science and of our art. Of the two, this is a more difficult and a higher attainment. In laboratory work there are facilities, prescribed methods, and chances for special technic drill and expertness, which ordinary diligence, good advantages, and extraordinary industry are pretty sure to command.

But the historical student has to group his facts so as to get at the deeper philosophy of history, and, where it is both a scientific and practi-

[1] See *London Lancet*, March, 1880; July 2, 1881.

cal field, must be able to bring a training and maturity of judgment, a capacity for selection and logical deduction, which demand a greater range of competency, and that balance of all mental powers which does not mislead others because it is not misled itself. He must know what Taine means when he speaks of one as able to discern a fact, and not an account of a fact of research, as distinct from inferences from research, and what Buffon means when he calls aptitude for patience a genius. This patient discernment, and arrangement of facts and reasoning therefrom, call forth some of the highest powers of the practitioner of hygiene. It is related of an astronomer at Washington, that at a recent marriage reception he seemed somewhat absorbed, and being asked whether he had saluted the bride, replied in the negative. His friend said, "Why do you delay?" "I have," said he, "no *facts* to communicate." We do not claim that social chat need abound in facts. But it were well if some of those ready to salute the bride whose name is Hygeia had more facts to communicate, such as in quality and quantity answer to the laws of evidence.

On his return from his first visit to England, some one is said to have asked Daniel Webster who was the ablest man to whom he listened in the House of Commons. His answer was, Sir Robert Peel. "As I entered," said he, "he was in the midst of a speech, and the first sentence I heard was, 'I now come to the onion seed.' He was discussing the budget of finance, and unfolding the sources of revenues and the regulation of trade. And so he went on from one item to another, with a precision of knowledge and an explicitness of detail that showed he had an intimate acquaintance with all the resources within the reach of the government, and knew how to suit laws to the indications in hand." It is just so with the true sanitarian. He seeks not only to know the seeds of disease, but how prolific they are, where they are disseminated, where they grow, and how to sterilize or isolate them. He is a master of facts in evidence and of details, and is ready to estimate *his* part of the work. It is a sphere in which more are misled than any other,—one of abundant writing of essays which are original only to their authors, of popular word-pictures of existing evils which often come from valuable men of ready style and utterance, but which will not be very much needed as building material for the future edification of this association.

The third field, that of administration, and the application of sanitary methods and experience, is vastly important and eminently practical. In some respects it requires a combination of qualities the most difficult of all. The sanitary officer needs, first of all, knowledge,—such knowledge as generally only comes from the habits of a close student; and yet his duties are such as not much to favor this study.

He must *know*, but, alas! because he knows, must exercise powers of self-restraint most tormenting. He looks around him, sees the situation—bad drainage, heaps of filth, bad domiciles, and foul streets. Greater sources of physical degradation, hidden from the world, glare out in his very presence. He knows all these mean sickness, shortened lives, now

and then a pestilence, race deterioration, misery, and chronic ill-success, which will tell on population, on industry, on finance, on thrift, on the very perpetuity of government. His manhood, his philanthropy, his skill, his knowedge, his patriotism, everything that is good, clever, and god-like in the man, is summoned to zeal in this service. But how embarrassed!—if he applies a tenth of the live-saving knowledge of which he is the modest possessor, he is sure to lose his own head. His expediency and his tact must be so cautious as to let the nine perish that he may not lose his chance for saving the tenth. How hard it is not to be radical when any jury of sanitary experts in the land would in one hour, after due trial, bring in a verdict that his moral heroism was saving all that is precious to the people and to the children which in the next generation are to be the nation.

If he confine himself to clearing up nose nuisances, he will have a following and some applause when the stench ceases. If he venture largely to prevent, he is himself prevented. Between politics and legislation, and the unconscious ignorance which most men have of the practical possibilities of sanitary reform as a personal, civic, and national blessing, is he not between an upper and nether millstone? or if not, at least between Gerazim and Ebal—a little band only on Gerazim, and the curses of Ebal loud and long?

The possible embarrassments in this direction have been made prominent for the last year or more. One hundred thousand munificent dollars to check epidemics, but not a cent to keep them from starting. Ten thousand dollars for salary, travel, and office expenses, when every member of a national board had said, Make all but five hundred of it available for investigation into the causes of disease and the modes of conducting preventive and restrictive measures.

As an American citizen, I feel far more humiliation from the sentiments of the congressional committee and the debate in the house of representatives, than from any temporary check given to national health administration.

America, with its grand progress in all material interests, has done so little to foster inquiry into the pervading evils which decimate and deteriorate population, that I was not prepared for responses to sentiments which involved the discouragement of all scientific inquiry into the causes of disease, and which not only crippled the hands but impugned the motives of some of the noblest men who have given unselfish attention to this great interest.

Money enough to chase a pestilence, but not a cent to investigate its cause or deal with diseases all over the land, is like washing hearses, buying coffins, and hiring grave-diggers and mourners for the victims of small-pox, while Jenner is refused a pittance in order to prevent it. Be ready with sappers and miners, with lint for bandages, for the first report of an explosion in a coal-mine; but close Sir Humphry Davy's laboratory, and proclaim his safety-lamp a wire screen for the amusement of the experimenters. This is not the plan of France and Germany, for

Pasteur and Koch have carried the war into Africa, and are studying causes alongside of the pyramids.

Yet, notwithstanding all this, we have no need to become discouraged. There are cities in the United States to-day where health administration, in spite of all embarrassments, has achieved results notable and grand and over which health officers preside whose names and opinions are a power at home, whose presence here is an inspiration and assurance of success. There are township and village officers who are educating the people, and giving tone to the popular sentiment. There are state boards, whose benificent influence is felt in their own state and throughout the land. There is a public press, whose utterances in this behalf have been able and thoroughly encouraging.

There will be occasional reverses and disappointments: for such a cause there is no law of strength without them. Pestilence itself becomes a sanitary measure. All these zigzag courses will not make a man give up his ship. Now-a-days we have enough old, experienced pilots to know whither we are sailing. We are progressive and aggressive because right, because backed by a science and an art able to certify themselves, and because there are means both of technical and popular enlightenment, which voice and pen, book and press, will not fail to use. But we should have great patience. It has truly been said that "the rapid progress of sanitary and preventive medicine during the last twenty-five years has not been from dawn, but almost from absolute darkness into daylight." It is not to be expected that there should always be settled convictions, or the apparatus for their application.

The whole subject of sanitary legislation is so new to the courts, that, leaving out the crudities of legislation, law has to receive fresh interpretations by judges, and precedents have to be secured by the moulding pressure of events.

While you may pick out localities of discouragement, yet, as an observer these many years of the underlying facts and the ground-swell of progress, I am sure there has been a steady deepening of the foundations and widening of the area and uprising of the strength of this great cause.

The great American constitution, the state constitutions, and these human constitutions will be found in this regard coöperating to conserve and preserve each other, for it means not a whit less than national life and prosperity. They are necessary to each other, and will find it out, while over each and all the ægis of law will extend its gracious protection.

It is a study and a practice which have their foundations in the nature of man, and in the essentials of personal, social, and civic existence. In it law and providence, science and art, philanthropy and philosophy, invite us to pure work, to great obedience, and to that noble devotion which consecrates itself to loving service for God and for humanity.

May it bind us closer to each other in the sympathies which are natural to those in kindred occupations, closer to all our fellow-men whose welfare is so much a part of our own, and closer to Him with whom is the power of an endless life.

ERRATA.

Page 1, line 17—for "Raunch" read Rauch.
Page 2, line 37—for "has there" read there has.
Page 3, line 3—for "Sanatates" read Sanatatis.
Page 3, line 9—for "Physics" read Physicis.
Page 6, line 25—for "Quintelet" read Quetelet.
Page 13, line 34—for "A skepticism" read Asepticism.
Page 16, line 38—for "odium" read oidium.
Page 17, line 44—for ". Those" read , those.
Page 20, line 6—semicolon after fact.

AN ADDRESS,

BY

EZRA M. HUNT, M. D. S. C. D.,

CHAIRMAN OF THE HEALTH DEPARTMENT, AMERICAN SOCIAL SCIENCE ASSOCIATION, 1883.

(Read September 5, 1883.)

Health is a great word, and describes a great thing. It was not by accident that in the Anglo-Saxon tongue it is the mother word of a score or more that are used to express the most bountiful and useful of all benefits. Wealth, well, well-done, welfare, hale, whole, wholesome, wholeness, holy, have this as their root, and are but specimens of the fulness of meaning which was felt to be conveyed thereby. The saving health among all nations was the climax with which the English translator sought to convey the Hebrew idea of a completed salvation.

When Franklin said: "Public health is public wealth," and when the latter word in *commonwealth* was made to stand for the weal of all society, there was a union of terms which are allied in thought not less than in language.

It is not merely that our highest conceptions of blessing must be expressed by physical conditions or by our highest estimation of some physical benefit. Before mankind began to analyze the fulness of one's self, it really included the intellectual, the spiritual, the social. It meant such harmonious adjustment and relation as did not necessitate a division into members and parts, or a deeper dissection between that which we now call material, mental and spiritual.

It applied that very word wholeness, or complete soundness to express them all, and made *it* a perfect synonym for all that manliness and womanliness mean in appearance, speech and behavior.

And so health stands to-day, whether we will or not, as a great generic thing, which means more than the world has yet begun to feel. However ready the assent to its value may be, it is too often without adequate appreciation or comprehension of what it means for society. The word was meant to indicate the adjustment of

every part of one's self to every other part of one's self, and of the universe, so that the long and true enjoyment of this welfare and wellness should last as long as life lasted.

To the individual, and not less to men and women in their associate capacity, it is the greatest inheritance. Old age, itself, has as one of its honors, the fact that it is a kind of testimony that health has been the property of ancestry, and a partial pledge that the gift is now handed down unimpaired to the coming generation. Since that is the only hope of perpetuity to the State, it is more than personal, filial or parental; it is patriotic.

If we were only after material resources, we could claim health as the greatest capital of the world. Pour out the gold from the mines, cover the seas and the rivers with ships and steamers, let the land wave its plumage of grasses and its thousands of miles of wheat fields. What are these as wealth, as material prosperity, unless there is power in the race, — power that must be physical if it shall be intellectual, moral and social?

It is high time that social and political science put a worthy and more deliberate estimate upon the material value of hygienic science and art.

How we glow into enthusiasm over the great forces of Nature as they are subjected to the uses of the world and made to work in engines and batteries for the productive energies of progress.

How we exult over the untold wealth of mines, over the richness of boundless prairies, and all the largess which mountain and valley, shore and sea, are pouring into the lap of Columbia's renown.

But what are all these, even as an estimate of material wealth, in compare with the question. What is the yield of men, women, and children which American civilization is furnishing? What are the physical forces resident in the aggregate population of the United States?

Orators may well point you to all the triumphs of machinery and art, to what this age has wrought out of the metals, and how iron has become the tough chattle which spans the bays, and with its fairy cords entwines the bowers of island cities; but, behind all other forces, aye, more than yet is told behind the everted moral and intellectual forces of the world, is the physical force of hearty, wholesome life — itself moral and reaching out to the Divine — when the exquisite adjustment which God himself has designed

between man, the masterpiece, and the rest of Nature, is thoroughly appreciated and maintained.

Here is the wealth of the country. When we are looking for the "physical apparatus of civilization," we must not overlook the people. The people, — this is the strength, this is the power.

I do not need to follow on to show how this physical vigor and its sustenance are indispensable to strength, success and perpetuity. All history tells us of physical degradation as the forerunner of national collapse. "Rome," says the historian, "perished for the want of men." The Statesmen, the Publicist, the Social Economist, the Moralist, the Christian Patriot, must look to the physical stamina of the woman and the man, not as always tall or always broad, but always, whether nightingale or eagle, in adjustment with its own parts and with its surroundings. We may, without damage, change a little the versification of Sir Wm. Jones, and say:

"What constitutes a State?
Not cities proud, with spires and turrets crowned;
Not bays, the ocean's gate,
Not broad expanse, with harvest-covered ground.
Not mines, richer than courts,
Not all the treasures of the earth and sea,
Not far renowned resorts,
Where tent and mansion tell of Liberty;
But men, high minded men,
With powers of thought, and fitted to endure,
Men who on toil depend,
And girt about with strength can dwell secure."

Would that this idea of the value of life and health in the population could take fast hold of our American people. Disease, or invalidity in some of its forms, is the background of illiteracy, of pauperism, of crime, of race degeneracy, in many ways to a degree not recognized. As ill health is largely preventable, a radical way of dealing with the distempers of social life is to prevent this, one of the most common and preventable causes or occasions of it.

An English traveller, a year or so since, on being asked what seemed to him the great lack of America, somewhat startled us by replying "*population*." We are so used to vaunt ourselves over our great growth that we forget what impression a man from the British Isles, or the crowded lands of the Old World gets, as he sees in the New England, the Middle, the Western, or the Southern

States, large spaces, — counties, indeed, some of them larger than States, — without 200 people in them, and then beholds the vast stretches of the West still untenanted and well-nigh unknown.

It is human beings carrying with them human health, that are wanted more than all the resources of earth, air or sea. And while we welcome all that is good and stalwart from the Old World, we need far more that sturdy growth on this side the waters which cannot be secured by importation, and which can be supplemented in the long run far less than most imagine. Pity be to the nation whose numbers are not replenished from within itself, but that trusts to importation for its whole supply.

The generations born upon the soil, must, to a degree not yet realized, be the trust and expectancy of American perpetuity. The land that will not support and sustain the health of its native born, cannot survive other forces which will limit the powers of foreign supply and make the government itself to be not only foreign, but mongrel, transient, and without a positive individuality of its own.

Put then, if you please, high material, commercial and national value on health, on native health, on the means of securing it to the children of foreign and native parents born on our soil, and thus claim health for prosperity and patriotism as well as for personal comfort.

Nor was there ever a time in history when health had such risks and so much needed social science to deal with as a factor.

It is often dealt with in an æsthetic way. It is such a ruddy and beautiful thing to exhibit and to talk about. Nay, more, it is patronized. Great sympathizers and administrators pat it on the head as a philanthropy. When a man goes a little further than this and seeks to show in it the reign of law, to speak of it as an appreciable acquisition, to propose methods that shall be anticipative in their field of operation and prevent disease, or to show science and art as pledged to it in advance, there are not wanting those who begin to call the devotee an expert or a specialist, suggestive many good things collateral to a profession and worthy of thought if time permit. Let us know that health has no such place. Sanitary science in its prevision does not build an annex to other temples. If it is anything it is a corner-stone. It is fundamental rather than ornamental. It is not made up of a few contributed pieces for a mosaic, but is integral to the very essence

of progress and to all that sociology means. It boldly comes forward as a chief necessity and says that, if we would improve society, we must improve health.

Death, as we see it in the world, is to be taken hold of as a misdemeanor. We do not object to the one horse shay, nor to the natural transfer to the other sphere in which Christians meet: but death as it wars with life on this planet, is an outrage upon the common decencies of humanity. It, and sickness to the degree that they obtain, can not be laid over to an extra-mundane spirit of evil, and much less to the account of Him of the *breach* of whose just and generous laws it is only a signal. The preventive art is each day showing that it comes into action not too soon among the disturbing *social* forces which are to be caught and tamed, and over which man has been put in control long before he was put in charge of steam or lightning, but which he has not regarded as conspicuous enough to be manipulated as more brilliant forces are.

So the problem is becoming more and more complicated. Civilization, while it means more possibilities of grandeur and effect than could be meant under any old *régime*, though it were that of a Roman Empire, also means that to degrade, to devitalize, to denationalize, was never a greater possibility than now.

It is one of the advancements of the age. The tendency to quick and rapid aggregation in cities—in cities built as modern cities are by men and women who work, wear and tear, think and travel to and fro as the populace does nowadays, is terrible. There is no ancient counterpart. Life has more risks than ever before. As it is more artificial, more gregarious, more packed, the compensations and adjustments cannot be trusted to any natural laws.

The laws of trade, the relation of machinery to capital and labor, the remarkable massing of operatives of all classes in cities, so that more than one-fifth of the population of the United States now lives in cities, lead one to say, "Whatever will tend to purify great cities effectually, will be an incalculably important blessing to the world at large; for the tendency of population to mass itself in cities is a phenomenon of all advanced modern nations."

Country-town manufactories are less and less established, deciding the fact that we are to take care of a population crowded out of propriety, and of kinds of population for which there must not only be forethought but foreact. The tendency of all such

massing is to neglect all little things, except such as are directly a part of the vocation followed.

Only thus can you account for what the people of towns and cities will put up with in the direct breach of the clear demands of physical life, and at length come not only to endure, but to resist change as an innovation. Of how far this neglect can go in our older cities we have had many instances. Nor is it less true that younger cities have sprung up, not as far west as Leadville, in which life is not so much imperilled by the bullet, but is, nevertheless, constantly under depreciating, enervating influences.

Nor is this because there is no mastering of the problem. How to choose a proper locality, how to drain land, how to build a healthy house, how to feed, air and clothe the inmates, how to remove all *débris* beyond the reach of those who cannot appropriate it with the same advantage as can the grasses and the grains, these are known as definitely as most facts in science and most of the experiences of applied art. Yet the threatening fact remains that the breach of sanitary law is constant, is progressive, and that social economy ought to attack it with all the vehemence and decision with which such a heroic principle would lay siege at the gate of a city whose name is Destruction. Here and there we have grand intimations that the thing can be done. Glasgow, with some serious disadvantages has realized the problem and has grappled with it grandly, so that with all its poor, its toiling labor, its concentrated industries and idlenesses, it meets the issues and can point to work and to results that prove there are adjustments and coöperations that can make parts of the city and theoretically the whole of a city healthy.

New Orleans, though it has been the very home of pestilences, has had an auxiliary sanitary association in which merchants and physicians and jurists and clergymen joined hands and have done marvellous things in reducing the sick rate and adding to sound comfort. Take a single instance. In 1879, the Auxiliary Association of New Orleans placed a powerful pump on the levee in front of the infected district, which encircled with fresh water from the river the entire rectangle of three by five squares, to which area the fever was successfully confined. Dr. White at once instituted a systematic house-to-house inspection followed by re-inspection.

The fever did not cross that boundary line. It was a *cordon sanitaire* better than a shot-gun quarantine.

Social science must begin its work in this behalf with household life. The house and one family are the sanitary unit, and the domicile the great care of sanitary administration. This is at once the hope and the discouragement: the hope, because if the parts can be made right, the whole is sure to follow; the discouragement because house-building or the construction and appointment of a home as a place favorable to the full physical scope of life is so foreign to the thought of most men as a primal design in this age. The housekeeping, "the practical knowledge of which," says Richardson, "is the principal glory of a woman," is lightly esteemed in urban life.

So long as homes are at the mercy of the architect, the contractor, the plumber, and the keeping is controlled in the interests of the servants, the boarders and the guests, so long shall we have a section left out of the back-bone of our American civilization, and our refinement will put up with a great deal of noxious stuff and consequent invalidity. Add to this the giving over of questions of the most important character as to sanitary construction to a control too political to be either economical or orderly, and we have complications, the first relief from which must come from their realization.

The practical art, as well as the great science of hygiene, takes a good turn when it resolves to address itself to the relief of these conditions, when it attempts to infuse into society the idea of homes, to give them separateness even when in the same building, to insist that they be healthful in the sense in which the best art and experience define them as capable of being, and then seeks by administration to secure their *keeping* in a sanitary way. As there is lack here—lack of knowledge, lack of training, sometimes lack of will, we are compelled to supplement. It is for this reason that the inspector of buildings and the health inspector, not to name others, become necessities, and should be sustained on a basis of civil service reform and as a social necessity. This means that these services should be appreciated, that officers who can pass examination as to competency, and have the tact and behavior which are requisite should be chosen, and thus a sustained foundation for intelligent oversight and aid be secured.

For all this effort at improving the condition of society by looking after the welfare of households, there are great encouragements not to be overlooked. One who attempts today to glean in

this harvest finds an area of ascertained truth broad enough for any intellectual vision, and a positive enunciation of principles and rules as definite as those of any of the applied arts.

Healthy houses, and how to make them, how to adjust life within them, how to feed, clothe, ventilate and exercise, are not the enigmas that some would lead us to believe.

Balances to the crowding life, appliances good for cleanliness, conveniences for physical vigor, capacity for the adjusting of ourselves to our surroundings, or of the surroundings to ourselves, multiply and meet the objects sought, if only the skill that can adapt is recognized and employed. The science of right living is known better than the art is practiced. Laboratory men, engineers and physicians, have done better than they are credited with. The trouble is that the average intelligence of the people or popular knowledge has not kept pace with the provision of students and scholars on these lines, and that *skilled labor*, because of the absence of industrial schools or some form of apprentice drill, is not always easy to command. There is far more lack, too, in our ability to conduct sanitary practice in an administrative way, because of embarrassments already referred to, than there is in knowing how to accomplish what we wish, if only we could be allowed to do it on the merits of the thing attempted.

The fact is, life, with all our talk about it, has not a very high value on this American continent. We know a grand jury that, to the horror of a just judge, hesitated to present a man who was well proven to have disposed of an infant of a few hours, because it was very young and he had many children. We know of another man who complained of his medical attendant as to his bill, and when he said, My charge is low enough for that of a cattle doctor, said "it ought to be lower; for my cattle have a money value but my children have not"; and this in the face of the fact that Massachusetts statistics show that in New England most families bid more than they cost, in the support of the household, before the age of twenty-one.

Not long since I overheard one of two little girls of not over nine, on their way to Sunday-school, say: "Do you know Mrs. Bolce's baby is dead." "Well, it is a good thing," said the other, "for when Mrs. Jones lost her twins I heard somebody say that she and the children were both better off." There is somehow a not always concealed feeling that the slaughter of the innocents

is one of the feasible limitations of population, even though it comes through watered milk, stale food, reeking tenements and ill care. Men moralize over these survivals of the fittest, and limitations of life, as if the Infinite Father had something to do in a conservative way with the breaches of his holy, just and beneficent laws. It seems to me we feel thus the more because, forsooth, emigration will make up the deficiency. All this is as bad in philosophy and in national thrift as it is in morality; not only because the same causes which kill these enfeeble the living and bleach out heredity, but because all that hygiene and sanitary science mean and all they can do to prevent disease and to appreciate life, are essential to any real progress in the objects which such an association as this represents. We cannot leave out of consideration the health care of population in all that it requires, as to legal enactment, as to statistics, as to the profoundest impression of its inexorable necessity on the popular mind, without leaving out one of the great arches on which we seek to build as upon sure foundations that superstructure of continuous life which we call a nation.

Next to household care, I am sure you will place the care of young life in its process of educational training. As sanitary instruction to adults is so often directly at war with habits already formed, and with prejudices imbibed, there is no very great expectancy of radical improvement in the *personnel* of the full-grown population. To instruct adults in anything physical so as to affect their habits is a difficult task. The chief hope in educating an adult is not in the change of his habits, but in impressing his judgment and opinions so that by precept, if not by example, he will inform the rising generation.

For these and many other reasons a large part of sanitary effort should be directed to those who are yet in young life.

It is because of this that instruction in physical life, as related to and modified by surroundings, should take its place as an important study. We do not mean that patronage by which the teacher in every department speaks prettily and well of hygiene, or which leads the higher schools and colleges now and then to invite somebody to give a lecture on the subject. It is training, drill, education, recitation that are needed. It must be as accurate and as precise, and in as skilled hands, as teaching in grammar or in arithmetic. Just as there are many who know these, who are

not fitted to teach them, so a general knowledge of physiology and hygiene does not prepare for the drill that is required.

We never recur to the enthusiasm with which Frœbel, Horace Mann, the elder Seguin and Canon Kingsley insist upon the rôle which physical education must bear in a system of education, without a feeling of some mortification that so many teachers are unconsciously making for it such a narrow sphere. It is divided up and assigned in the most accommodating way among those who, if others attempted to fill *their* special departments with similar agility of preparation, would be loud in their cry of superficiality and incompetency.

It is not even physiology that is needed half so much as teaching in hygiene which shall direct as to the uses of the senses and the limitations of their use, the law of muscular activity, the relations of food and force, the sources of disease, the dangers that beset life in country and in city, the disabilities which are to be provided for and guarded against, the laws of heat, of ventilation, of the flow of air and of fluids, of the changes of organic matter, of scores of items that come distinctly into the body of doctrine and duty which constitutes hygiene. One or two colleges in all the land have given this distinct recognition to the subject; but our systems of public education are far behind in this respect.

The truth is, that, with all our congratulatory talk about the public school systems of our States and cities, they are among the most inflexible of all institutions. Fostered by the public money, and easily glossed over by the fact that the popularity of the cry for popular education serves to screen from close espionage fossilized boards of education and routine instructors, it is practically very difficult to give to teaching in political science and economy, in social science, in physical education, and in industrial arts such recognition as the present wants of society demand. Little annexes are arranged to meet local clamor, therefore, with the thought that it is temporary enthusiasm which will soon die out, and the felt, though not uttered, resolve is, that the old curriculum is perfect enough, and that innovation is not to be tolerated.

It may as well be borne in mind that the public school systems of Prussia, of Holland, perhaps of Sweden, are in advance of ours, and that England is pressing us very closely. Until the public demand in these matters takes the shape of a legislation so definite as to define or provide for the methodical training in such branches,

we have little hope of more than talking, lecturing and patronizing, which do not amount to disciplining or drilling, and so are incompetent to secure bodily vigor. But physical vigor "so far underlies soundness and sufficiency of mental culture, that hygiene will yet be recognized as a fundamental element of common school education."

Next, there is need of an enlargement of vision as to the scope of the subjects included in hygiene.

It is always the case that any science or art, which is regarded as so simple as only to need a few weeks of reading in order to secure teaching ability therein, gives the impression of narrowness.

To too many all sanitation is but the announcement of a set of rules and suggestions as to a few common things in the conduct of human life. So far from this, it has a breadth of meaning, a wealth of material, and an extent of acquirement which fully certify it both as a separate science and a practicalized art. Some other sciences have come quite to realize this, because of the gifts and offerings which they have contributed, and the necessity that these have realized for a special class of students who should grasp and appropriate what is offered, and fit it more precisely to human needs. In this way chemistry, histology, botany, zoölogy, mechanics, natural philosophy, psychology, and various other departments have advanced with their offerings, and not a little has been done by the votaries of these to suggest or to adapt them to the demands of human life and welfare.

The laws of life, their *modus operandi*, the laws governing animate and inanimate life as related to human life, the relations of all organic matter, the modes of its discord or adjustment, and many other subjects are found of essential interest and bearing.

Biology, in the fulness of its meaning, has to be studied exhaustively, if for nothing else, because of its bearing on human life. Every phase and step of existence must be closely defined, so that, alongside of it, we may study all influences that are operative thereupon. Thus the outline of the study is very inclusive, and cannot be dispensed with. In the single department of etiology, or the causation of disease, it is marvellous what developments we are having, and how they are already utilized in the limitation of disease. The study of epidemiology has become an inspiration, because of the microscopic surprises it furnishes, and of the minute, yet successful, experimentation which has resulted.

By easy recognition of disease, by attenuation, asepticism, and by isolation, we have today mastery over epidemics, which is inspiriting to any man or board fortified by laws sufficient to enforce a wise and competent sanitary jurisdiction. The study of modification of type, perhaps of hybridization, and of all the details of minute plant life, as related to disease, is like awakening with eyes magnified to the observation of the minutiæ of an infinitesimal botany and zoölogy. We find ourselves in a garden of contending plant life and animal life so prolific and so imminent in all that relates to our lives and health, as that a very stoic would arise and enter upon classification and description, with a view to the relief of human suffering and the prevention of invading disease. The chemical forces are not less interesting in their study or important in their bearing on vitalization and devitalization. It is the province of hygiene to define and exhibit what perfect living is, so far as it concerns the physical life, what are the forces against which it has to guard, and what are the deliverances which human knowledge and foresight can secure. The relation of all industries to health and law, the evils of trades and occupations are to be summarized. The structural and mechanical arrangement of all receptacles and conduits for the safe carriage of house *débris*, are specimens in another direction of inquiry, whose limits are not yet imagined. Fields broad enough for the social scientist, the physician, the philanthropist. Indeed, in all the range of the sciences or of the arts, you cannot touch themes more intimately blended with the every-day life of society, with the question of self-preservation, of happiness, of *welfare* in its largest, broadest, grandest sense.

There must be recognition, study and practice, commensurate with such a height, breadth, length and depth of meaning. While this Association recognizes it as but one amid many other departments that have to do with the vital concerns of society, it can insist upon it as so basic in its position, as so indispensable in its appreciation, as to claim for it prominence in all attempts to adjust life so as to secure that highest welfare which the interests of society, not less than those of the individual, demand. The God who made this body a temple, and adorned it with all manner of precious things, made it also to represent what frailty to law can do for its well being, and what a breach of law can do to frame mischief or iniquity, which expresses itself in physical, as it does in

intellectual and moral debasement. The God-like, the Christ-like in humanity, must be taken care of in accord with the law of our being, as well as that of revealed will, and then shall we behold a harmony too often obscured by a lawlessness which has become so common as to be mistaken for the original fiat and stamp of the Almighty. The section which, on this occasion, I have the honor to represent, has found itself led by force of circumstances to give prominence to three subjects:

Inebriety, in its influence on society as well as on individuals, and on the penal and dependent classes, is a theme so forcibly intruding and projecting itself into the very vitals of social, civil and economic art, as it concerns the State, that it almost passes from the domain of the moralist, the psychologist and the philanthropist to that of the sociologist, the political economist, and the statesman. Grave questions are now being raised as to what are the theoretical, and what are the practical, ways in which to deal with it. Shall we attack it *ab initio*, or go a gunning at it by a kind of guerrilla warfare? Shall we treat it as a disease, a frailty, or a crime? While we are not of those who would emphasize it as to be dealt with from a civic standpoint as primarily a disease, yet it is well, as with all crime, to look at it from the physical and social, as well as the moral, standpoint.

The logician who holds his equilibrium amid the laws of the physical and the immortal, and recognizes each superior in its sphere, and each independent somewhat of the other, does not kill with the letter the spirit that giveth life. Practically, we need great study and great observation to find out what is the practical thing to be done with inebriety as an enormous disturbing force in social and governmental life, as an explosive whose dynamic capacity is as dangerous in the new United States of America, as slavery was in the old. It carries with it so much breach of law, so much that is solemn and burdensome to government, so much of responsibility that is avoidable, yet actual, that we do well to allow it to be considered by able authorities, and to be presented for your valuable discussion. As there are those who would deal with it as primarily a disease, we give to this view a hearing.

Insanity has before been up for your consideration in its bearing on social life. The unmistakable increase in the causes that produce it, has given to American nervousness an application almost as if the average American had a special distribution of nervous

filaments and a superabundant nervous organization. The rush of travel, the rapid methods of business, the strain of routine labor, the crowding of office work, the drive of machinery, the unvarying monotony of the calculator, the telegraph operator, the telephonist, the sewing machinist, and many other industries, of which these are but technical specimens, together with the wild effort to get wealth, or to keep up with the times, or to make a living (no simple thing in these times when living respectably means so much), all these and other forces, tend to drive mind and matter alike out of shape and out of propriety, and to confuse both in the wild turmoil of unbalanced existence.

Palatial asylums, modified retreats, and the tens of thousands of homes that have some member not quite ready for these, and yet, by reason of disordered sensations or deranged correlation of parts, unfit to go two-handed, single-hearted, and level-headed into the conflict of life, too plainly tell us that there is work for social science, and adjustment for social art behind the discords of the world's great stage. How to prevent all this, is a subject that touches the heart-strings.

3. The *sanitary requisition of our dwelling-places* includes within its sphere most important questions of civil and domestic life. While at this session we only attempt to introduce it, we trust that we shall draw such attention thereto, as will lead to a closer study of all locations, of structural conditions, of the embarrassment or impediment to healthy household life, whether in hamlet, summer resort, city home, or boarding and hotel caravansaries. As to it, we have had abundant generalization and advertising of evils.

What we now need is the specific enunciation of safeguards, many of which are known. Still more we need to know, how by skilled aid to secure the doing of what we do know, that thus the vigor of life may be maintained, and that it may be converted into such force and productivity as will tell upon human progress and the promotion of human happiness and usefulness.

Great errors in household conditions have their origin in the use of undrained ground, in imperfect material and structure of buildings, in the modes of introducing the various conduits or pipe systems which now are a part of the habitation and that want of sanitary inspection during construction, which will prevent the covering up of unskilled work. The social compact and its welfare, are so concerned in this matter, that good government, not

less than good health, requires an oversight at the beginning instead of a constant activity without insight or a tinkering with evil results.

These, ladies and gentlemen, are themes incidentally chosen from the wide extended field which deals with human health as a factor in social science; subjects which must have the most philosophic and practical consideration if we would carry forward the nation to a capability to meet the growing demands that are made upon it for sound bodies, sound minds, and healthy characters.

So sure as the reign of law is the grand fidelity and constancy that pervades the universe of God, and forms the nexus of which all human law, called government, is but a copy or an attribute, so sure is it that we must find out and follow out in the individual and social life those laws of health which pertain to the compact not less than to the individual.

Only so shall we avoid penalties which are as sure in the physical as in the moral government of the Creator, and come to know for the nation, by knowing for the man, the woman and the child, how integral and essential to social and civic existence is the full realization and meaning of these words, *to be*, and *to be well*, which our good mother-tongue has joined with a hyphen and made grandly strong in that word of profitable thought and enormous meaning which it calls *well-being*.

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Enteric Fever and Cesspool Dangers. Loc. Cit., 1882.

Sanitary Inquiries into the Condition of Charitable and Penal Institutions. Loc. Cit., 1882.

Sanitary Inspection of Sea Side Resorts. Loc. Cit., 1882.

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List of Articles furnished as Editor of the Sanitary Column of "The Independent":

June	6, 1878.	Sanitary Work for the Household.
"	13, "	The Houses We Live In.
"	20, "	Our Summer Resorts.
"	27, "	The Public Health.
July	4, "	Summer Air.
"	11, "	Disinfectants.
"	18, "	How to Use Disinfectants.
"	22, "	Sanitary Funerals.
August	1, "	Water, Pure Water.
"	8, "	Our Summer Vacation as Related to Health.
"	15, "	How to Save the Children.
"	23, "	How to Save the Children.
"	30, "	Epidemics and their Sanitary Bearings.
Sept.	5, "	School Children.
"	12, "	The Necessity of Household Sanitary Inspection.
"	19, "	A Social View of Health.
"	26, "	Yellow Fever; Its Prevention and Treatment.
October	3, "	Health and Cookery.
"	10, "	Foods and Cookery.
"	17, "	Public Laxity in Respect to Doctors.
"	24, "	The Limitation of Disease by Modern Remedies and Appliances.
"	31, "	Instruments, as Life and Health Preservers.
Nov'r	7, "	Our Hospitals and their Relation to Public Health.
"	14, "	Public Health and the Yellow Fever Convention.
"	21, "	The Winter Care of Our Homes.
"	28, "	The Sanitary Meeting at Richmond.
Decem'r	5, "	The Public Health Association at Richmond.
"	19, "	Hospitals and Health.
"	26, "	Diphtheria and its Prevention.
January	9, 1879.	British Hospitals.
"	16, "	English Hospitals.
"	23, "	European Hospitals.
"	30, "	European Hospitals.
[illegible]ary	13, "	Health Tracts for the People.
"	20, "	Protection Against Disease.
"	27, "	About Cesspools, Drains, &c.
March	6, "	Adulterations Injurious to Health.
"	13, "	Our Lights and their Dangers
"	20, "	Healthy Homes.
"	27, "	Health of Other Animals as Related to that of Man.
April	3, "	The Asiatic Plague.
"	10, "	Prevention of Infectious Diseases.
"	17, "	Infection and New Orleans.
"	24, "	Anticipative Treatment of the Individual.
May	1, "	Consumption as a Preventable Disease.
"	8, "	New York Quarantine.
"	15, "	New York Quarantine as Guarding the Public Health.

May	22, 1879.	Doctors and Health Boards in Council.
"	29, "	Talks About Vaccination.
June	5, "	State Charities of Massachusetts.
"	12, "	State Charities of Massachusetts.
"	19, "	American Surgery and its Sanitary Triumphs.
"	26, "	Heredity and Disease.
July	3, "	New Views of Alcohol.
"	17, "	New Views of Alcohol.
"	24. "	Malaria.
"	31, "	Sea Bathing and Health.
August	7, "	Sea Bathing.
"	14, "	Health as a Governmental Care.
"	21, "	State and National Boards and Public Health.
"	28, "	The Author of "Rab and His Friends" on Health.
Sept.	4, "	Sanitary Circular of New Jersey State Board of Health.
"	11, "	Canon Kingsley and Sanitation.
"	18. "	Life Problems and Prof. Parvin's Address.
"	25, "	Stimulants and Narcotics as Related to Health.
October	2, "	Sanitary Exhibit of Apparatus and Appliances.
"	9. "	Physiology and Hygiene (Andrew Coombe, etc.)
"	16. "	Public and Professional Interest in Hygiene.
"	23, "	Population and the Health of Cities.
"	30. "	Health Guards for the Winter.
Nov'r	6, "	Cremation and Health
"	13, "	Cremation and Health, No. 2.
"	20, "	The National Health Convention.
"	27, "	How to Guard Against the Evils of Earth Burials.
Decem'r	4, "	American Public Health Association; Sanitation of Cities.
"	11, "	Study of Epidemics.
"	18, "	Poisons and their Antidotes.
January	1, 1880.	A Sanitary New Year.
"	8, "	Should Our Children be Vaccinated.
"	22, "	Edison, Electric Lights and Health.
"	20, "	Fashion and Health.
Feb'y	5, "	Bodily Protection and Care.
"	12, "	How to Bring Up Children Healthy.
"	19, "	Healthy Amusements for Children.
"	26, "	Health and Female Education.
March	4, "	Diseases of Animals.
"	11, "	Drainage and Health.
"	18, "	How to Keep City Ground Dry.
"	25, "	Endemic Pleuro-Pneumonia and the Study of Epidemics.
April	1, "	Nerves and How to Use them.
"	8, "	The Teeth as Related to Health.
"	15, "	Dangers to Health.
"	22, "	Health Care of Public Buildings.
"	29, "	Dust and Disease.
May	6, "	Artificial Foods for Infants.
"	13, "	Summer Ventilation.
"	20, "	Vital Statistics and Health.
"	27, "	Science Schools and Baltimore Charities.
June	3, "	Human Eyes and How to Use Them.
"	10, "	Princeton and Health.
"	17, "	Public Health and the American Public Health Association.
"	24, "	Benefits of Bad Sanitary Arrangements.
July	1, "	Protection to Bathers.
"	8, "	Summer Health.
"	15, "	Our Disinfectants.
"	22, "	The Princeton Fever.
"	29, "	How to Dispose of Slop Water and Excretal Matter.
August	5, "	Social Science and Health.
"	12, "	The Cause of Periodic Fevers. (Bound Brook Illustration.)
"	19, "	Tanner's Fast and its Bearing on Health.
"	26. "	The Need of Closer Study of Localized Fevers.

Sept.	2, 1880.	Kerosene Explosives.
"	9, "	Public Health as Related to the Diseases of Animals.
"	16, "	The Opium Habit.
"	23, "	Sanitarians at Saratoga.
"	30, "	Public Health at the Social Science Association.
October	7, "	Sanitary Exhibits.
"	14, "	Going Into Winter Quarters.
"	21, "	Alcohol and Health.
"	28, "	Periodic or Malarial Fevers.
Nov'r	4, "	Health as Related to Medical Education.
"	11, "	The Sanitary Regulation of House Construction.
"	18, "	Physical Training and Our Schools.
"	25, "	Industrial Schools as Related to Health.
Decem'r	2, "	Sanitary Associations and Conventions.
"	16, "	Health Laws and their Scope.
"	23, "	Small Pox and Diphtheria.
"	30, "	The A. P. H. Association at New Orleans.
January	6, 1881.	The Work of the A. P. H. Association.
"	13, "	Our Furnaces of Affliction.
"	20, "	The Hygiene of the Sick Room.
"	27, "	Our Railroad Diseases.
Febry	3, "	Relations of Distilled and Fermented Liquors.
"	10, "	Sanitary Studies and their Bearings on Insanity.
"	17, "	Our Personal Sanitary Systems.
"	24, "	Relations of Patent Medicines to Public Health.
March	3, "	"Tale of a Tub."
"	10, "	How to Correct Errors in Sanitary Construction.
"	17, "	House Drains and other Sanitary Appliances.
"	24, "	House Traps, Grease Traps and Water Closet Apparatus.
"	31, "	Manufactured Filth and Climate Deaths.
April	7, "	Water Closet Systems and Appliances in Houses.
"	14, "	Chloralism and its Effect on Health.
"	21, "	Our Milk Supply and Public Health.
"	28, "	House Care and House Keeping.
May	5, "	The Disposal of Sewage.
"	12, "	Streams and their Relation to Health
"	19, "	American Medical Association.
"	26, "	Whence Our Water Supply.
June	2, "	Adulteration of Foods and Drinks.
"	9, "	Sanitation of the Teeth.
"	16, "	Trichinosis.
"	24, "	Summer Care of Children.
"	30, "	The Tobacco Habit.
July	7, "	Dust and its Evils.
"	14, "	Our State Boards.
"	21, "	Notes on Health Board Articles.
August	18, "	Our Foods.
"	25, "	Food and Cookery Values.
Sept.	1, "	Life Insurance, Vital Statistics and Health Care.
"	8, "	Health Insurance based on Death and Sickness Rates.
"	15, "	Livingstone's Lessons on Doctors and Health.
"	22, "	The Health and Race Teachings of Barbarism.
"	29, "	Artesian and Driven Wells.
October	6, "	Vaccination and its Control Over Small Pox.
"	13, "	Sanitary Aspects of the International Medical Congress.
"	22, "	The Present Status of Preventive Medicine.
"	29, "	The Germ Theory of Disease as Applied to Preventive Medicine.
Nov'r	3, "	Sanitary Exhibits.
"	10, "	Water Supply.
"	17, "	Sewerage for Cities.
Decem'r	1, "	Sewage and What To Do With It.
"	8, "	Disposal of Household Matter.
"	15, "	The Public Health Association.—Malaria.
"	22, "	School Hygiene.
"	29, "	Meeting of the American Public Health Association.

January	5,	1882.	Malaria, Vaccination, etc.
"	12,	"	The Insanitary Condition of Guiteau.
"	19,	"	Errors in Sanitary Precepts.
"	26,	"	Small Pox and Vaccination.
Feb'ry	2,	"	Noises and their Effect on Health.
"	9,	"	The Duties of Ministers in Contagious Diseases.
"	16,	"	Perils to Health.
"	23,	"	Various Perils to Human Life.
March	2,	"	The Law of Nuisances.
"	9,	"	Fire Escapes.
"	16,	"	Care of the Dead and Preparation for Burial.
"	23,	"	Sanitary Supervision of Institutions for Education.
"	30,	"	Milk and Goats from a Health View.
April	6	"	Sewerage for Country Homes and Villages.
"	13,	"	Family and Race Questions as to Health.
"	20,	"	Housekeeping and Housecleaning.
"	27,	"	Communicable Diseases.
May	4,	"	Sanitary Conditions at the Summer Homes.
"	11,	"	How to Keep Houses Pure.
"	18,	"	Personal Sanitation.
"	25,	"	Dr. Brown and his Health Talks.
June	1,	"	The Art of Prolonging Life.
"	8,	"	Hygiene as Related to Social Questions.
"	15,	"	How to Recuperate.
"	22,	"	Public Health and the Am. Med. Asso.
"	29,	"	Disposal of the Dead.
July	6,	"	Labor Questions and Health.
"	13,	"	Notes on Vaccination.
"	20,	"	The Abuse of Alcohol.
"	27,	"	Sanitary Summer Talk.
August	3,	"	The Scope of Sanitary Care.
"	10,	"	The Great Unwashed.
"	17,	"	Malaria.
"	24,	"	The Fever Warning Along the Shore.
"	31,	"	Disinfectants.
Sept.	7,	"	Is the River and Harbor Divide a Clean Bill of Health.
"	14,	"	School Instruction in Health.
"	21,	"	Free Thinkers Convention Hygienic Salvation for Humanity.
"	28,	"	Water Supply.
October	5,	"	Bodily Health and Faith Cure.
"	12,	"	The Legal Relations of Health.
"	19,	"	The A. P. H. Asso. Anthrax, Texas Disease and Vaccination.
"	26,	"	The Health Value of Sickness and Storm.
Nov'r	2,	"	A. P. H. Asso.
"	9,	"	Malaria and its Causes.
"	16,	"	Winter Heating and Ventilation.
"	23,	"	Personal Cleanliness.
"	30,	"	Rest and Laziness, Contentment and Health.
Decem'r	7,	"	Good Water and its Tests.
"	14,	"	Health and Beauty.
"	21,	"	The Cities of the Dead.
"	28,	"	Sanitary Associations and Conferences.
January	4,	1883.	How to Protect Schools from Uncleanliness and from Contagious Diseases.
"	11,	"	New Year Resolutions and Bodily Rights.
"	18,	"	Lungs and their Health Care.
"	25,	"	Are Sleeping Cars Healthy?
Feb'ry	1,	"	The Bellevue Hotel Case.
"	8,	"	House Pipes and Sewer Connections. Report.
"	15,	"	Ventilation of Soil Pipes, Sewers and Cesspools. Report.
"	22,	"	Typhoid Fever and Hotel Bellevue.
March	1,	"	Alcohol in the Light of Recent Studies.
"	8,	"	The New Orleans Sanitarian.
"	15,	"	The Tubercle Bacillus. Is Consumption Contagious?
"	22,	"	Soap and its Uses.

March	29, 1883.	Non-Organic Materials in Water.
April	5, "	School Health Circular.
"	12, "	Spring and its Risks to Health.
"	19, "	The Adulterations of Foods.
"	26, "	Health of Laborers.
May	3, "	Winter Changes and Winter Resorts.
"	10, "	Is Consumption Contagious?
"	17, "	Did Methuselah Wear Spectacles?
"	24, "	The Public Health as Related to Physicians.
"	31, "	Labor and Health.
June	7, "	The Summer Solstice and Health Seeking.
"	14, "	Malaria; its Causes and the Defenses Against It.
"	21, "	Is Public Law Improving Health? If not, why not?
"	28, "	Medical Societies and Public Health.
July	5, "	Pure Water and Pure Ice.
"	19, "	Indigestion.
"	26, "	Overwork.
August	2, "	Bathing and Drowning.
"	9, "	Cholera and its Prospects.
"	16, "	Health and Dependency. Social Science.
"	23, "	Education versus Health.
"	30, "	Our Summer Foods.
Sept.	6, "	Health and Social Science. (Address.)
"	13, "	Insanity and How to Deal With It.
"	20, "	Social Science and Health.
"	27, "	Progress of Hygienic Knowledge.
October	4, "	House Building.
"	11, "	Roadways and Streets.
"	18, "	Dyspepsia and How Much It Means.
"	25, "	Medical Ethics as Related to Public Health.
Nov'r	1, "	Care of Children.
"	8, "	Possible Extensions of Life, of Time and of Seasons.
"	15, "	Malaria and Physical Exercise.
"	22, "	American Public Health Association.
"	27, "	Sanitarians in Council.
Decem'r	6, "	Heating and Ventilation.
"	13. "	Sanitation in Canada.
"	20, "	Sanitary Conventions and their Work.
"	27, "	The Physical Types of the Population of the Future.
January	3, 1884.	Healthy Holidays.
"	10. "	The Hygiene of the Sea.
"	17, "	Sanitary Homes.
"	24, "	Personal Responsibility for Health.
"	31, "	Is One Sidedness Healthy?
Feb'ry	7, "	Lung Diseases.
"	14, "	Dr. Elisha Harris and his Sanitary Service.
"	21, "	State and Local Boards of Health.
"	28, "	Fashion and Health.
March	6, "	House Pipes.
"	13, "	Hygiene and What It Means.
"	20, "	Health Report of New Jersey.
"	28, "	What Shall We Drink?
April	3, "	Prevention of Contagious Diseases.